



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

SOME HITHERTO UNPUBLISHED OBSERVATIONS OF ORESTES ST. JOHN ON PALEOZOIC FISHES.

C. R. EASTMAN.

MR. ORESTES ST. JOHN, the only pupil of Professor Louis Agassiz who took up the study of fossil fishes, and whose researches in this class of vertebrates, published in Vols. VI and VII of the *Illinois Palæontology*, are among the leading contributions to the literature of American Paleozoic forms, passed his early life in the vicinity of Waterloo, Iowa, and during a period of fifteen years, dating from 1863, brought together one of the finest collections of Meso-Devonian fish remains ever obtained from that state. This collection has recently been deposited in the Museum of Comparative Zoölogy at Cambridge, where Mr. St. John was formerly assistant in paleontology, and it is understood that further collections from the Carboniferous of the Mississippi valley are to follow. In the same institution are also preserved some of the type specimens which are described in Vol. VII of the *Illinois Reports*, with casts of others that are now in the State Museum at Springfield, Illinois.

Accompanying the St. John collection of Devonian fishes is a manuscript description and drawing of a nearly perfect mandibular (gnathal) plate of *Dinichthys pustulosus*, an interesting species whose occurrence in Iowa, Illinois, and Wisconsin has only recently been made known. As this species was originally described from portions of the dermal armor, examples of the dentition being at that time unknown, and as doubt has been expressed¹ whether it really pertains to *Dinichthys* rather than to some other coccostean, it is of interest to find its dinichthyid nature confirmed by this early discovery of St. John's, the credit

¹ Dean, D. Palæontological Notes, *Mem. N. Y. Acad. Sci.*, vol. ii (1901), p. 122.

for which is after a long period of oblivion finally secured to him. The actual specimen, whose description follows, appears to have dropped out of sight altogether; but if still in existence, the present account may perhaps lead to its resurrection.

Other interesting observations of St. John with reference to *Edestus* and *Cochliodus* are contained in the form of a personal letter to Professor Agassiz, written in 1871, extracts from which are quoted in the following, and his sketch of *Edestus minor* is here reproduced. Detached segments of *E. heinrichi* have been figured by Newberry¹ and Trautschold,² and a corresponding example of *E. minor* from the vicinity of Moscow is described by Karpinsky,³ but St. John's specimens are the only ones, so far as the writer is aware, that have been found of the latter species in this country.

Professor Agassiz was one of the first to pronounce upon the nature of these problematical fossils, and compared them with the rostral prolongation of *Pristis*. Leidy saw in their segmented condition a resemblance to the compound maxillary of *Lepidosteus*, but later regarded them as elasmobranch spines, an opinion concurred in by Sir Richard Owen, Newberry, Woodward, and most modern writers. They are now definitely determined, however, to be the symphysial dentition of cestraciont sharks.⁴

I. ON THE OCCURRENCE OF DINICHTHYS IN THE HAMILTON LIMESTONE OF ILLINOIS.

(August, 1882.)

"Professor A. H. Worthen has obtained from the Devonian limestone of Andalusia, Rock Island County, Illinois, a nearly perfect example of the right mandibular dental plate of a small species of *Dinichthys*, which is quite distinct from either of the two forms already described by Dr. Newberry from the Ohio

¹ *Ann. N. Y. Acad. Sci.*, vol. iv (1883), Pl. V, Figs. 2 a, 2 b; *Monogr. U. S. Geol. Surv.*, vol. xvi (1889), Pl. XXXIX, Figs. 2 a, 2 b.

² *Bull. Soc. Imp. Nat. Moscou*, vol. lviii (1883), Pl. V, Figs. 1, 2.

³ *Verh. k. russ. Mineral. Ges. St. Pétersbourg* [2], vol. xxxvi (1899), pp. 381, 450, Text-figs. 15, 62.

⁴ *Geol. Mag.* [4], vol. ix, p. 148; *Bull. Mus. Comp. Zool.*, vol. xxxix (1902), No. 3.

Shale [*D. herzeri* and *D. terrelli*]. The age of the beds from which this specimen was derived is unquestionably not later than the Hamilton, as is shown by associated Brachiopoda, etc., characteristic of the Hamilton of Iowa and Illinois. The present specimen, therefore, affords the earliest indication of this genus yet discovered.

"The characters displayed by the Illinois specimen, which serve to distinguish it from the Ohio forms, may be summarized briefly as follows:

"1. The dental plate under discussion, while resembling *D. herzeri* in general form and proportions, differs from the latter in the character of the cutting edge, which is destitute of the series of conical denticles occurring in that species. The dentary portion of the mandible is similarly well demarcated from the spatulate posterior shaft, and is similarly rounded along the front margin. The anterior beak is much produced, irregularly lozenge-shaped in transverse section, with a sharply rounded anterior angle and a sharp posterior cutting edge. A deep notch separates the cusplike beak from a low, round-crested prominence in advance of the cutting edge of the dentary, which is deeply beveled along its outer face by attrition against the upper dental plates. To the same cause is probably to be ascribed the gently concave curve of the trenchant border itself. The latter terminates abruptly behind, and along the posterior slope of the dentary are to be counted the bases of five small downwardly directed denticles. The lower portion of the posterior slope is smooth and meets the shaft in an obtuse angle. In this denticulation of the posterior slope of the dentary, and perhaps also in the presence of an elevated prominence or denticle behind the anterior beak, are to be found the principal differences between the present specimen and *D. terrelli*.

"2. The form of the shaft is not unlike that of *D. herzeri*, except that it is more contracted immediately behind the dentary portion, and more regularly arched along its lower border before passing into the acutely rounded posterior extremity. The general outline of the shaft is spatulate, its outer face moderately convex, and it is separated from the dentary portion

by a shallow, curved depression. *D. terrelli* has a relatively shorter and more massive posterior shaft. As contrasted with the compact structure of the dentary portion, which has almost the density of enamel, the spatulate shaft is finely striato-punctate, and presents more the condition of osseous tissue.

"3. In *D. herzeri*, the secondary prominence or denticle behind the anterior beak is buttressed on the inner side by a prominent angulation or ridge [this is really part of the denticle, and occurs in other species as well], which sweeps from the apex of the denticle downward and backward until it merges with the thickened portion of the dentary bone. But in the

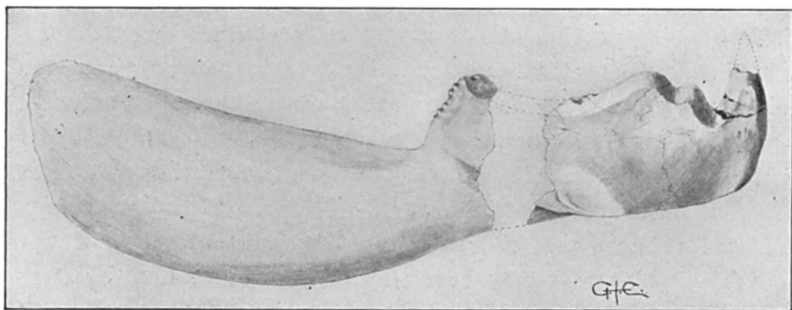


FIG. 1. — *Dinichthys pustulosus* Eastm. Hamilton limestone; Andalusia, Ill. Right gnathal plate. $\times \frac{1}{2}$ (nearly).

present species the entire inner surface is deeply excavated, and there is no evidence of a buttress having occurred.

"4. The present specimen evidently belonged to a species of much smaller size than either *D. herzeri* or *D. terrelli*, since the total length of the mandible is only 20 cm., while both of the Ohio forms exceed 60 cm. That it does not pertain to an immature individual seems plainly indicated by the marks of wear, and general appearance of the bone.

"The salient features which have been pointed out in the foregoing are sufficiently characteristic to warrant the establishment of a new species, which we have pleasure in naming in honor of Dr. J. S. Newberry, to whom we owe the admirable notice of the two first discovered species. In the accompanying figures are shown (A), view of right mandibular ramus from

external aspect; (*B*), inner aspect of anterior portion of the dentary; and (*C*), inferior view showing external outline and channel separating the dentary portion from the shaft.

"*Horizon and Locality*: — Hamilton Limestone; Andalusia, Rock Island County, Illinois."

[NOTE. — The specific title which St. John had intended to propose has already been applied by Dr. J. M. Clarke¹ to a gnathal plate from the Hamilton of western New York. Moreover, although St. John clearly has the priority of discovery, the species which he here recognizes as distinct has been described under the name of *D. pustulosus*.² Only one of the

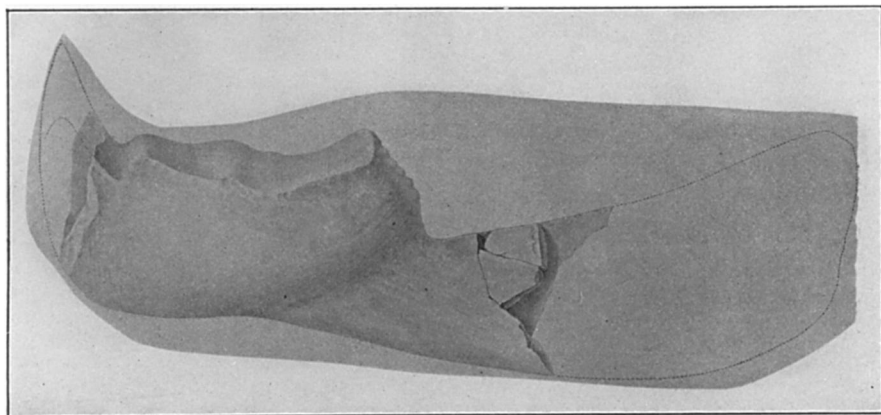


FIG. 2. — *Dinichthys pustulosus* Eastm. Hamilton limestone; Milwaukee, Wis.
Left gnathal plate. $\times 8$.

illustrations to which he refers is now extant. It is reproduced in the accompanying Fig. 1, and in Fig. 2 is shown a corresponding dental plate belonging to an individual of about equal size from the Hamilton of Milwaukee, the original being preserved in the Milwaukee Public Museum. A fragmentary gnathal of *D. pustulosus*, from the Hamilton of New Buffalo, Iowa, is also preserved in the Museum of Comparative Zoölogy at Cambridge.]

¹ *Bull. U. S. Geol. Surv.*, No. 16 (1885), p. 17, Pl. I, Fig. 1.

² *Bull. Mus. Comp. Zool.*, vol. xxxi (1897), p. 38, Pl. III, Fig. 4; *Amer. Nat.*, vol. xxxii (1898), p. 748, Figs. 1, 2; *Journ. Geol.*, vol. viii (1900), p. 32, Fig. 1.

II. OBSERVATIONS ON EDESTUS AND COCHLIODUS.

(From a letter addressed to Professor Louis Agassiz, dated Springfield, Illinois, June 29, 1871.)

"MY DEAR PROFESSOR :

"Excuse this postscript, but I met with rare success yesterday morning, in the finding of what appears to be the terminal denticle of an immature *Edestus vorax* [*sic*] Leidy. This is

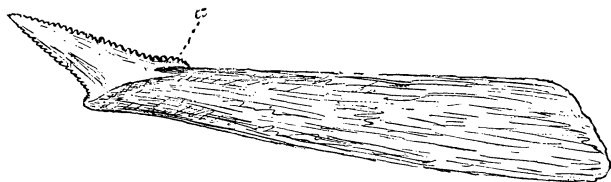


FIG. 3. — Detached segment of *Edestus minor* N. and W. Coal measures; Illinois.

the second specimen known to me in which only a single denticle occurs — the other one, from a similar horizon in the Coal Measures, being referable to *Edestus heinrichi* N. and W., and readily distinguished from the former species by the stronger [development] and more erect position of the denticles. The slight depression at 'a' [Fig. 3] indicates the area occupied by the overlapping of the posterior extremity of the succeeding [*i.e.*, preceding] denticle, which, however, is not developed in the present individual.

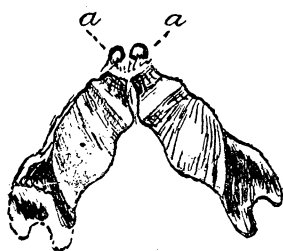


FIG. 4. — *Cochliodus sancti-ludovici* (St. J. and W.). St. Louis limestone; Alton, Ill. Enlarged.

"I also received last evening a remarkably beautiful specimen of *Cochliodus* sp. from the St. Louis limestone. The specimen is very small, and presents two, or a pair, of the large posterior teeth in their relative position; but what is particularly interesting, it shows the coarsely osseous [*i.e.*, cartilaginous] posterior

prolongation of the rami, which appear to be terminated in articular processes much in the same manner as occurs in the modern Cestracion. The two nodes *a, a* [Fig. 4] are apparently the anterior prolongation of the rami for the support of the

dental plates in that portion of the mouth. And of these anterior teeth I believe we have specimens—a very small, narrow, enroled form—much resembling the ‘second’ tooth of *C. contortus*.

“The genus *Trigonodus* of Newberry will have to be abandoned, it being identical with his *Sandalodus*. The described forms of the latter probably represent the superior dentition.

“Very respectfully,

“O. St. J.”

[NOTE.—It is evident from St. John’s pen-and-ink sketch, reproduced in Fig. 3, that his specimens of *Edestus* belong to *E. minor* N. and W., instead of to *E. vorax* Leidy. The confusion probably arose from the fact that Leidy’s name is inadvertently applied to the type of *E. minor* by Newberry and Worthen in their explanation of Plate I of the fourth volume of the *Illinois Palæontology*, an error which was subsequently corrected. The type specimen of *E. vorax* is now preserved in the Museum of the Academy of Natural Sciences of Philadelphia; that of *E. minor* in the Cabinet of Amherst College; and that of *E. giganteus*, which is scarcely distinct from *E. vorax*, in the Columbia College Museum. The location of the type specimen of *E. heinrichi* has been ascertained to be in the State University at Urbana, Illinois.

The depressions on either side of the median projection at *a*, in Fig. 3, are not marks of contact with an adjoining denticle, as supposed by St. John, but are plainly channelings corresponding to the buttressed condition of the crown in *Campodus variabilis* (N. and W.). In fact, a comparison of the symphysial series of the latter with the type of *Edestus minor* proves that the coronal apices of the two forms are surprisingly alike. The detached segments of *Edestus* are often pyritiferous, and their decomposition is best arrested by treating them with a film of collodion.

The specimen of *Cochliodus* referred to in the second paragraph above is figured by St. John and Worthen in Vol. VII of the *Illinois Palæontology*, Pl. viii, Fig. 8 *a*, under the name of *Pæcilodus sancti-ludovici*. There seems to be no sufficient reason, however, for its removal from *Cochliodus*. The complete dentition of this genus is known in at least one species, *C. latus* Leidy. A magnificent specimen is described by Newberry and Worthen in Vol. II of the same work, in which the two pairs of enroled dental plates belonging to either side of both upper and lower jaws were found in natural association with the anterior series, the latter having the form of “*Helodus*” teeth. The symphysial series of the same species has been described by Newberry (*Ann. N. Y. Acad. Nat. Sci.*, Vol. xvi, p. 301, Pl. xxiv, Fig. 24) under the name of *Helodus coxanus*. In *C. contortus* the anterior and symphysial series have not yet been definitely recognized as such.]